

ABSTRACT OF THE DISCLOSURE

An improved semiconductor device structure comprises insertion of a semiconductor wafer into a high-pressure heated chamber and the deposition of a low-melting point aluminum material into a contact hole or via and over an insulating layer overlying a substrate of the wafer. The wafer is heated up to the melting point of the aluminum material and the chamber is pressurized to force the aluminum material into the contact holes or vias and eliminate voids present therein. A second layer of material, comprising a different metal or alloy, which is used as a dopant source, is deposited over an outer surface of the deposited aluminum material layer and allowed to diffuse into the aluminum material layer in order to form a homogenous aluminum alloy within the contact hole or via. A semiconductor device structure made according to the method is also disclosed.

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